



Laboratory engineer Bill Nelson inspects the bombed-out reactor and nuclear research facilities at Tuwaiitha (just outside Baghdad) during the first inspection after Desert Storm.

Inspecting for Weapons of Mass Destruction

At the end of Operation Desert Storm, the world was full of rumors about Iraq's nuclear capabilities and how much of them remained following an intense bombing campaign. In May 1991, a specially selected team, under the auspices of the United Nations Special Commission (UNSCOM) and the International Atomic Energy Agency (IAEA), was assembled for the first inspection of Iraqi nuclear facilities under UN Security Council Resolution 687. Laboratory engineer Bill Nelson was a member of that team.

The first and subsequent UNSCOM/IAEA inspections uncovered evidence of an advanced Iraqi nuclear program, code-named Petro-Chemical Project 3. At Tarmiya, inspectors uncovered Project 946, a uranium enrichment production facility that the Iraqis attempted to hide by removing railings from the floor of the building, pouring a new layer of concrete, and putting rubble on top. They had developed a first-class electromagnetic isotope separation capability, with supporting research and industrial infrastructure. Production of 10 to 30 kilograms of highly enriched uranium, a key component of nuclear weapons, might have occurred within two years.

Perhaps the defining moment came in September 1991, when UNSCOM/IAEA Team 6 discovered a large cache of documents. Two Laboratory scientists were on the team; another was at the UN supporting the operation. For five days, there was a standoff in Baghdad between the team of inspectors, which wanted to remove

the documents from where they were found, and hundreds of heavily armed Iraqi soldiers. Sleeping on pieces of cardboard in the building's parking lot and sometimes without even water, the group refused to leave without the papers they considered to be the smoking gun. The documents indeed proved critical in establishing a knowledge baseline of the Iraqi program.

Iraqi facilities were inspected for any evidence of weapons of mass destruction—not just nuclear, but also chemical and biological weapons and ballistic missiles—and equipment was destroyed, seized, or subjected to monitoring. In all, over a dozen Laboratory researchers took part in various inspections until the UN removed all personnel in 1998 because of an increasingly hostile atmosphere. Livermore scientists also developed, installed, and maintained sophisticated inspection and monitoring equipment in Iraq, such as automated cameras and microwave communication links for remote surveillance of facilities that could be used in missile production.

Livermore continues to provide technology, analysis, and expertise to help prevent the spread or use of weapons of mass destruction. Soon after the Iraq inspections began, Laboratory Director John Nuckolls formed the Nonproliferation, Arms Control, and International Security (NAI) Directorate. The new directorate merged a variety of related activities into a comprehensive program to address all steps in the nonproliferation process, including prevention, detection and reversal, and response to potential proliferant states and terrorists.

Iraqi Calutrons

Laboratory physicist Jay Davis, twice a member of UNSCOM/IAEA inspection teams, found the Iraqi isotope separation technology was similar to that developed at the University of California (UC) at Berkeley in the late 1940s to enrich uranium for America's first atom bomb. Called the calutron because of its UC origin, the technology was abandoned by the U.S. because of cost. However, it was an excellent choice for Iraq in that calutrons required few outside resources. Davis estimated the Iraqi Manhattan Project-style effort at between 6 billion dollars and 8 billion dollars and noted that the quality of work was "every bit as good as we could do today."

